Woodley, C., C. Downs, J. Fauth, J. Halas, P. Muller, R. Curry, E. Fisher. 2004. Coral reef health assessment in the Florida Keys. In *Abstract Book* Society of Environmental Toxicology and Chemistry's Fourth SETAC World Congress and 25th Annual Meeting in North America.

ABSTRACT- Coral reefs within the Florida Keys are disappearing at an alarming rate - 38% from 1996-2000. From a resource management perspective, the primary question is whether coral declines result from global stresses (e.g., climatic forces), local stresses, or synergistic effects of both. Traditional coral mapping and monitoring programs have difficulty resolving this question, leaving the identity of the stressors and the mechanism of morbidity/mortality unknown. In 1999, we determined that a high-surface temperature anomaly caused an oxidative stress induced coral bleaching event and coral mortality. In 2000, populations of Montastraea annularis at four sites within the Florida Keys National Marine Sanctuary and one reef within Biscayne National Park were sampled on a quarterly basis. Cellular Diagnostics analysis indicated that the corals were severely stressed in March, and later exhibited significant mortality by August. More sophisticated cellular diagnostic analysis indicated that the corals in March were hyper-expressing xenobiotic detoxification defenses, while ICP/MS analysis of the tissue indicated high arsenic content. In 2001, the project was expanded to include four more coral reef sites and four more species: two fish species (white grunt and bicolor damsel fish), a gastropod, and sea grasses. Data for species were correlated from one site to another. For example, stress biomarker patterns in corals mirrored patterns seen in gastropods and fish, though there was some variation. Major findings from this expanded study from 2001-2003 were: (1) endocrine disruption in both species of fish were associated with xenobiotic toxicity; (2) gastropod endocrine disruption exhibited a similar pattern as seen in corals at specific sites; (3) coral cellular biomarker patterns were correlated with other markers of coral physiological assessment (lesion regeneration rates); and (4) stress patterns of all four species of animal were higher in the fall/spring sampling periods compared to the summer sampling periods.